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extent of this region to the length of the elongating zone. PICCARD's method of 1904, which has lately been justified by HABERLANDT,<sup>24</sup> is considered by NEWCOMBE as "too precarious to be satisfactory." All the phenomena, he concludes, "accord equally well with the hypothesis of the extension of the sensitiveness through the elongating zone, but diminishing from the apex backward; or . . . of a more equable sensitiveness through the elongating zone, and a stronger autotropism in the posterior than in the anterior part." We should much prefer the former hypothesis; if for no other reason, because it is unfortunate to postulate "autotropism" when it can be avoided.—C. R. B.

**Development of Marchantia.**—Because no consecutive account of the development of the sexual organs and sporogonium of *Marchantia*, complete in itself, has been published by one author, DURAND, while preparing slides for class use, has published an account of the development illustrated with a close series of figures.<sup>25</sup> The account contributes little which is new to students making a critical study of this form. For the first time, although it has been illustrated by CURTIS, formal attention is called to the familiar "mushroom anchor" foot. One striking feature in the development of the sporophyte has been overlooked: the sterile plate of cells at the apex of the capsule, and also the occasional appearance of a columella, which in some instances extends entirely through the center of the capsule. Because of its relation to the theory of sterilization of sporogenous tissue this plate of cells and the occasional columella should have some attention.—W. J. G. LAND.

**The nucleus of bacteria.**—MEYER claims<sup>26</sup> that the following methods will differentiate a nucleus in the bacteria. The particular form used was *Bacillus Pasteurianus*. First method: boil in water, stain 24 hours in hematoxylin, and differentiate in weak hydrochloric acid. The nuclei of young spores are sharply outlined. Second method: fix in Flemming's solution, harden in 20 per cent. alcohol, stain in Delafield's hematoxylin, and differentiate with hydrochloric acid. Third method: fix in Flemming's solution, harden in alcohol, stain in iron alum hematoxylin, and differentiate under the cover glass with ammonium ferrosulfate. Judging from the figures, this method gives the best results.

In the opinion of the reviewer, the fact that MEYER does not believe that any nucleus has as yet been demonstrated in the Cyanophyceae would not inspire confidence in his interpretation.—CHARLES J. CHAMBERLAIN.

**Anatomy of Sapotaceae.**—Incidentally, in seeking the origin of laticiferous tissue in Sapotaceae, Miss SMITH<sup>27</sup> made anatomical studies of seedlings of fourteen

<sup>24</sup> BOT. GAZETTE 47:482. 1909.

<sup>25</sup> DURAND, ELIAS J., The development of the sexual organs and sporogonium of *Marchantia polymorpha*. Bull. Torr. Bot. Club 35:321-335. pls. 21-25. 1908.

<sup>26</sup> MEYER, ARTHUR, Der Zellkern der Bakterien. Flora 98:335-340. figs. 3. 1908.

<sup>27</sup> SMITH, WINIFRED, The anatomy of some sapotaceous seedlings. Trans. Linn. Soc. London II. 7:189-200. pls. 25, 26. 1909.

species distributed among eight genera. The vascular system of the primary root and hypocotyl is typically tetrarch and corresponds with two bundles from each cotyledon without change of position. In some species the root is hexarch; in others, variable and anomalous. The occurrence of the hexarch type led the author to suspect that a central cotyledonary trace, such as is found in some species of *Diospyros*, had aborted, but no sign of this could be found. In *Bumelia tenax* the root is usually hexarch. In the upper part of the root and the hypocotyl, four of these bundles differ from the other two in that from them alone rise the lateral rootlets, and also in that they alone are continuous with the bundles of the cotyledons.—W. J. G. LAND.

**Fungus excreta.**—A condition almost like that in successive cultures of the higher plants is reported for certain fungi by LUTZ.<sup>28</sup> He finds that in nutritive solutions in which various molds (*Aspergillus*, *Botrytis*, *Cladosporium*, *Fusarium*, *Mucor*, *Penicillium*) have been grown, there are produced substances which retard or accelerate the germination and growth of the same or other species. These products have much in common with enzymes; they are destroyed by high temperatures (80–100° C.); their action is weakened by dilution, ceasing usually at about 20-fold; they are destroyed in sunlight (20 hours), the violet rays being most efficient. Some of these substances may be stopped by a clay filter, but some pass through. The agents which accelerate growth and development are formed in lighted cultures, especially those of *Fusarium* and *Aspergillus*.—C. R. B.

**Chemotropism of fungi.**—As part of the larger subject, parasitism, SCHMIDT has investigated the chemotropism of an unknown species of *Phyllosticta*, parasitic on pear leaves.<sup>29</sup> He is apparently ignorant of FULTON's work on this subject,<sup>30</sup> and with experimentation that is open to serious objection, comes to the conclusion that this plant is positively chemotropic. Its chemotropism, however, is not supposed to come into play at once, "but the fungus itself must first, by enzymatic, toxic, or purely mechanical means, so alter the normal structure of the epidermal cell as to set free a diffusion stream, counter to which, as a directive stimulus, the further growth of the fungus proceeds." This view he promises to support in a second paper.—C. R. B.

**Culture solutions.**—Any who are interested in water-cultures should consult a recent paper by BENECKE,<sup>31</sup> who has been testing the efficiency of VON DER CRONE's solution, in comparison with the older ones. VON DER CRONE proposed in 1904 a solution nearly like SACHS's, except in the addition of the iron as ferrous

<sup>28</sup> LUTZ, OTTO, Ueber den Einfluss gebrauchter Nährlösungen auf die Keimung und Entwicklung einiger Schimmelpilze. Ann. Mycol. 7:91–133. 1909.

<sup>29</sup> SCHMIDT, E. W., Ueber den Parasitismus der Pilze. Zeit. Pflkrankh. 19:129–143. figs. 7. 1908.

<sup>30</sup> BOT. GAZETTE 41:81–108. 1906.

<sup>31</sup> BENECKE, W., Die von der Cronesche Nährsalzlösung. Zeits. Bot. 1:235–252. 1909.